TECHNICAL BULLETIN 14

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This issue supersedes all previous issues

Builders' guide to Australian steel sheet and strip standards

INTRODUCTION

As consumers become increasingly aware of the various performance requirements imparted on steel building products, so too must manufacturers and trades be aware of, and adhere to, the relevant codes and standards which set those performance requirements. In Australia, these are the National Construction Code (NCC) and various Australian Standards. The NCC comprises the Building Code of Australia (BCA) and the Plumbing Code of Australia (PCA). The relevant Australian Standards set out specific requirements which relate to products used by the building industry with respect to, for example, corrosion resistance, strength and installation procedures.

All of BlueScope Steel's metallic coated products and accessories for the Australian building industry comply with the NCC and meet "deemed-to-satisfy" performance requirements. Next generation ZINCALUME® aluminium/zinc/magnesium alloy coated steel AM125 has been CodeMark certified (GM_CM30033 Rev A) as complying with the NCC in respect of material durability and compatibility when used for gutters and downpipe systems, while other applications are covered by relevant Australian Standards referenced in the NCC.

This Technical Bulletin sets out to explain the terminology of metallic coated steel sheet and strip adopted in the standards in order to simplify their interpretation and use.

There are two Australian Standards for the base steel sheet materials used in building trades:

- **AS 1397:2011** – For zinc-coated and aluminium/zinc/magnesium alloy-coated steel sheet.
- **AS/NZS 2728:2013** – For prepainted steel sheet.

Australian Standards also cover other aspects of the trade with specifications for products manufactured from steel sheet materials and their installation. These include:

- **AS 1445-2013** – For corrugated steel sheet.
- **AS 1562.1-1992** – For design and installation of metal roofing and walling.
- **AS 2050-2002** – For metal roofing battens under roof tiles.
- **AS/NZS 2179.1:1994** – For metal rainwater goods.
- **AS/NZS 2904:1995** – For flashings.
- **AS/NZS 3500 (Set)** – For plumbing and drainage components.

NOTE:
All Australian and Australian/New Zealand Standards should be read to incorporate any and all amendments to the most recently published version.

STEEL SHEET MATERIAL STANDARDS

1. Australian Standard AS 1397:2011

"Continuous hot-dip metallic coated steel sheet and strip – Coatings of zinc and zinc alloyed with aluminium and magnesium".

All hot-dipped metallic coated sheet and strip produced by BlueScope Steel for the Australian building industry complies with Australian Standard AS1397:2011. The products in AS 1397:2011 include materials for a variety of building applications, examples of compliant products are shown in *Table 1*.

2. Australian/New Zealand Standard AS/NZS 2728:2013

"Prefinished/prepainted sheet metal products for interior/exterior building applications – Performance requirements"

AS/NZS 2728:2013 divides environments into categories in which prepainted products must perform and specifies the paint properties to achieve a satisfactory performance. Having the correct material used for building products is the responsibility of the building specifier. For recommended finishes and details of the COLORBOND® steel type to perform in various environments, please refer to the following Technical Bulletins:

Technical Bulletin TB-1A
Steel Roofing Products – Selection Guide

Technical Bulletin TB-1B
Steel Walling Products – Selection Guide

COATING CLASS DESIGNATION

Coating class designation is a widely used terminology system which combines coating mass with coating type. The various coating class designations are defined in AS 1397:2011. The coating type describes the elemental makeup of the coating. For example, Type AM is an aluminium/zinc/magnesium alloy while Type Z is zinc. The coating mass defines the minimum mass of coating per square metre of steel sheet (total of both surfaces). For reasons of compliance with

Table 1: Recommended AS 1397:2011 compliant products for use in building applications.

APPLICATION	STEEL BUILDING PRODUCT STANDARD (or equivalent)	PRODUCT
Roof Cladding	AS 1562.1-1992	COLORBOND® steel AM100 / ZINCALUME® steel AM125
Wall Cladding	AS 1562.1-1992	COLORBOND® steel AM100 / ZINCALUME® steel AM125
Rainwater Goods	AS/NZS 2179.1:1994, CodeMark	COLORBOND® steel AM100 / ZINCALUME® steel AM125
Steel Roof Battens	AS 2050-2002	TRUECORE® steel AM150

NOTE:
BlueScope Steel recommends ZINCALUME® steel sheet be specified for roof, wall and rainwater applications if a metallic coated finish is desired and TRUECORE® steel for ALL steel building frame installations. The outdoor performance of products manufactured from COLORBOND® steel sheet or strip is equivalent, or superior, to that of ZINCALUME® steel.

AS 1397:2011 and to ensure appropriate product selection, it is not sufficient to simply state whether the sheet should be Type AM or Type Z without specifying the coating mass, i.e. the amount of corrosion protection required. *Table 2* outlines the designation of two common coating classes.

BASE METAL THICKNESS

The appropriate approach to specification of coated steel is by nominating the Base Metal Thickness (BMT), this relates to the thickness of the steel substrate of the product. BMT is specified due to the base steel being the component that provides structural load bearing capability, rigidity and other mechanical properties. There have been isolated cases in Australia where Total Coated Thickness (TCT) has been specified. Given the Australian market is based on BMT, there is a risk that TCT specification may lead to engineering confusion and structural failure and for these reasons TCT must not be used.

However, measuring the TCT can be used to indicate whether the specific BMT has been supplied. *Table 3* provides the approximate overall thickness (approximate TCT) for a nominated BMT and coating class.

MECHANICAL PROPERTIES

The guaranteed minimum yield strength is specified by a number following the letter "G". This indicates that the mechanical properties of the steel were obtained by inline heat treatment prior to hot-dip metallic coating. Yield strength is the point to which steel can be stressed before it deforms permanently. Yield strength is expressed in megapascals (MPa) with a higher number indicating greater structural strength.

For example:

- G250 is a structural grade with minimum yield strength of 250MPa.
- G300 is a slightly higher strength grade ideal for roll-forming.
- G550 is a very high strength steel.

SPECIFICATIONS

Ideally, specifications should combine the coating class and minimum yield strength with the BMT (mm).

For example:

- 0.42mm G550 AM125 for ZINCALUME® steel
- 0.60mm G300 Z450 for zinc-coated steel

STEEL BUILDING PRODUCT STANDARDS

These are Australian Standards for finished goods made from steel sheet materials:

1. **Australian Standard AS 1445-2013** "Hot-dipped zinc-coated, aluminium/zinc-coated or aluminium/zinc/magnesium-coated steel sheet – 76mm pitch corrugated".
2. **Australian/New Zealand Standard AS/NZS 2179.1:1994** "Specifications for rainwater goods, accessories and fasteners. PART 1: Metal shape or sheet rainwater goods, and metal accessories and fasteners".

Specification of the base steel sheet Australian Standard and the steel building product Australian Standard will ensure the correct material is used and that the finished product is made to specified quality Australian Standards.

INSTALLATION STANDARDS

These Australian Standards ensure a correctly manufactured steel sheet building product is fixed to a building in a specified manner. The Australian Standards include:

1. **Australian Standard AS 1562.1-1992** "Design and installation of sheet roof and wall cladding – PART 1: Metal".
2. **Australian Standard AS 2050-2002** "Installation of roof tiles" (for the selection and installation of metal roofing battens under roof tiles).
3. **Australian/New Zealand Standard AS/NZS 2904:1995** "Damp-proof courses and flashings" (for the selection and installation of flashings).
4. **Australian/New Zealand Standard AS/NZS 3500 (Set)** "Plumbing and drainage".
   a. AS/NZS 3500.3:2003 "Plumbing and drainage – PART 3: Stormwater drainage".
   b. AS/NZS 3500.5:2012 "Plumbing and drainage – PART 5: Housing installations".

COATING TYPES AND THEIR COMPATIBILITY WITH OTHER METALS

BlueScope Steel recommends that for the vast majority of conditions involving atmospheric exposure, i.e. roofing, walling, accessories and rainwater items; COLORBOND® steel and ZINCALUME® steel made from aluminium/zinc/magnesium alloy-coated steel will provide better long term performance than other metallic coatings that have historically been used in the building industry (such as zinc or aluminium/zinc alloy).

Both aluminium/zinc/magnesium alloy and zinc coatings are affected adversely by run-off from, or contact with, copper. Uncoated lead must not be used with COLORBOND® steel or ZINCALUME® steel products.

Further information on acceptability of direct contact between various materials is given in Australian/New Zealand Standard AS/NZS 3500.3:2003.

Table 2: Designation of two common coating classes.

COATING CLASS DESIGNATION	COATING TYPE	COATING MASS (minimum grams of coating per square metre – total of both surfaces)
AM125	Aluminium/zinc/magnesium alloy	125
Z450	Zinc	450

Table 3: Approximate Total Coated Thickness for a given Base Metal Thickness and Coating Class.

ZINCALUME® STEEL		BMT (mm)	ZINC-COATED STEEL	
APPROXIMATE TCT (mm)	COATING CLASS		COATING CLASS	APPROXIMATE TCT (mm)
0.39	AM125	0.35	Z275	0.39
0.46	AM125	0.42	Z275	0.46
0.54	AM125	0.50	Z275	0.54
0.59	AM125	0.55	Z275	0.59
0.64	AM125	0.60	Z450	0.67
0.645	AM150	0.60	Z600	0.69

NOTE:
The service life of metallic coated steel is dependent on the type and thickness of the metallic coating, not the thickness of the steel base.

Although compatible with respect to physical contact, zinc coatings should not be used for rainwater goods and tanks where water from a ZINCALUME® steel roof drains into them. AQUAPLATE® steel for water tanks incorporates an impervious polymer membrane on the internal surface to prevent contact between stored water and the metallic coating.

For more information on product selection and compatibility, please refer to the following Technical Bulletins:

Technical Bulletin TB-1A
Steel Roofing Products – Selection Guide

Technical Bulletin TB-1B
Steel Walling Products – Selection Guide

Technical Bulletin TB-3
AQUAPLATE® steel for Water Tanks

Technical Bulletin TB-8
Flashing Materials for COLORBOND® steel and ZINCALUME® steel Sheet

Technical Bulletin TB-15
Selection and Use of Steel Gutter and Downpipe Products

Corrosion Technical Bulletin CTB-12
Dissimilar Metals

HOW TO SPECIFY FOR BEST PRODUCT PERFORMANCE

Prior to product specification, it is recommended to consult **Technical Bulletin TB-13** *General Guide to Good Practice in the Use of Steel Roofing and Walling Products*, which includes information and advice on material selection, common design considerations, storage of material on site, handling of material, installation, selection of fasteners, cutting and avoidance of swarf damage, compatibility of accessories (including flashings and sealants) and maintenance procedures to contribute to long product life.

In addition to the information contained in **Technical Bulletin TB-13**, specifications should consider the following:

- Minimum coating class shall be as specified in *Table 1*.
- All steel sheet and strip used for roofing, walling and rainwater goods shall be formed from COLORBOND® steel or ZINCALUME® steel complying with Australian Standard AS 1397:2011 and branded accordingly.
- The impacts of custom length, as compared to stock length, for COLORBOND® steel or ZINCALUME® steel.
- Downpipes shall be COLORBOND® steel or ZINCALUME® steel.
- If a corrugated profile has been chosen, the finished product shall comply with Australian Standard AS 1445-2013.
- Finished rainwater goods shall comply with Australian/New Zealand Standard AS/NZS 2179.1:1994 (or equivalent) and Australian/New Zealand Standard AS/NZS 3500.3:2003.
- Base steel grade and thickness will depend on product profile.
- All accessories shall be of similar material to the finished product(s).
- Discharge from copper pipes shall not flow over/into the finished product(s).

CONCLUSION

It is in the best interest of the specifier and end-user of hot-dipped metallic coated steel products to demand compliance with the NCC and relevant Australian Standards.

By combining the correct thickness of coating, base strength, associated materials and installation practice, the greatest potential value and product performance are realised often at no extra cost.

RELATED BLUESCOPE STEEL TECHNICAL BULLETINS

Technical Bulletin TB-1A
Steel Roofing Products – Selection Guide

Technical Bulletin TB-1B
Steel Walling Products – Selection Guide

Technical Bulletin TB-3
AQUAPLATE® steel for Water Tanks

Technical Bulletin TB-8
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REFERENCED AUSTRALIAN STANDARDS

- **AS 1397-2011** – *Continuous hot-dip metallic coated steel sheet and strip – Coatings of zinc and zinc alloyed with aluminium and magnesium.*
- **AS/NZS 2728:2013** – *Prefinished/ prepainted sheet metal products for interior/exterior building application – Performance requirements.*
- **AS 1445-2013** – *Hot-dipped zinc-coated, aluminium/zinc-coated or aluminium/zinc/magnesium-coated steel sheet – 76mm pitch corrugated.*
- **AS 1562.1-1992** – *Design and installation of sheet roof and wall cladding – Metal.*
- **AS 2050-2002** – *Installation of roof tiles.*
- **AS/NZS 2179.1:1994** – *Specifications for rainwater goods, accessories and fasteners – Metal shape or sheet rainwater goods, and metal accessories and fasteners.*
- **AS/NZS 2904:1995** – *Damp-proof courses and flashings.*
- **AS/NZS 3500 (Set)** – *Plumbing and drainage.*

NOTE:
All Australian and Australian/New Zealand Standards should be read to incorporate any and all amendments to the most recently published version.

If you have any questions regarding this Bulletin, please contact BlueScope Steel Direct on 1800 800 789.

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